

## Visibility

On a large ship it is possible to make use of objects aboard the ship for estimation when the visibility is very low, but it should be recognized that these estimates are likely to be in error since the ship may affect the air. For the higher ranges, the appearance of the land when coasting is a useful guide, and the distance of landmarks, just as they are appearing or disappearing, may be measured from the chart. Similarly, in the open sea, when other ships are sighted and their distances known, e.g., by radar, the visibility can be obtained. In the absence of other objects, the appearance of the horizon, as observed from different levels, may be used as a basis of the estimation. Although abnormal refraction may introduce errors into such methods of estimation, they are the only ones available in some circumstances. At night, the appearance of navigation lights can give a useful indication of the visibility.

### Note

- When the visibility is not uniform in all directions it should be estimated or measured in the direction of least visibility (excluding reduction of visibility due to ship's smoke).



The sea horizon is clearly visible at the extreme right of the picture, but elsewhere it is completely blotted out by dense fog banks, the nearest of which is on the left at a distance of 150 m (photo by A.J. Aalders)



Reduced visibility by sea smoke (photo by P.W.J. van Hurck, m.v. Statengracht)

## Marine Observers Handbook

Although the use of such terms as fog, mist and haze is suitable for a general indication of the state of visibility in the WW code or in the text of a ship's logbook, a more precise method is needed in weather messages to indicate to the meteorologist the degree of obscurity of the atmosphere, irrespective of the reason that causes it. On land, observations are made of a number of selected objects at fixed distances, the distances increasing roughly in such a way that each distance is nearly double the next smaller distance. The determination of the most distant object of the series which is visible on any given occasion constitutes the observation of visibility. At sea such a detailed determination of visibility is not usually possible, but in making estimates of visibility a coarser scale is used, as shown below.

### VISIBILITY SCALE FOR USE AT SEA

<i>Code</i>		<i>Code</i>	
<i>figure</i>		<i>figure</i>	
90	Less than 50m	95	1.1 n.mile or 2km
91	50m	96	2.2n.mile or 4km
92	0.1 n.mile or 200m	97	5.4n.mile or 10km
93	0.27 n. mile or 500 m	98	10.8 n. mile or 20 km
94	0.54 n. mile or 1km	99	27.0 n. mile or 50km

Note 1: If the distance of visibility is between two of the distances given in the table, the code figure for the shorter distance is reported. Note 2: The prefix '9' before each of the scale numbers appears here because this table is part of a code for reporting visibility in two figures by radio (see Met.O.509, *Ship's Code and Decode Book*, or *Admiralty List of Radio Signals*, Volume 3).

In a long vessel the determination of the lowest numbers offers no difficulty as objects at known distances may be used. Visibility numbers in the middle range indicate conditions of obscurity such that the visibility is greater than the length of the ship but is not sufficient to allow full speed to be maintained. The only means of obtaining observations for the higher numbers of the scale are as follows. When coasting and when fixes can be obtained, the distance of points when first sighted, or last seen may be measured, from the chart. In the open sea, when other ships are sighted, visibility may be estimated by noting the radar range when the vessel is first sighted visually and again when it disappears from view. It is customary to use the horizon to estimate visibility numbers in the higher range although this cannot be relied upon. There are cases of abnormal refraction when the visible horizon may be very misleading as a means of judging distances, particularly when the height of the eye is great, as in the case of an observer on the bridge of a large vessel.

The estimation of visibility at night is very difficult. What the meteorologist is interested in knowing is the degree of transparency of the atmosphere. But the distance seen at night depends on the amount of illumination; and the distance at which a light is seen depends on its intensity or candle-power. If there is no obvious change in meteorological conditions, the visibility just after dark will be the same as that recorded just before dark irrespective of the fact that one may not be able to see as far. A deterioration in visibility can sometimes be detected afterwards and the visibility figure adjusted accordingly. In doing this, care must be taken not to confuse the effect of a decrease in illumination, as for example when the moon sets, with a genuine decrease in visibility. The presence of a 'loom' around the vessel's navigation lights is frequently a guide to deteriorating visibility.